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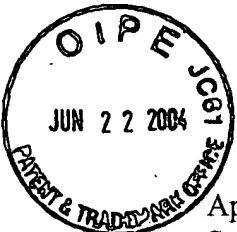
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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Suk H. Cho et al.                      Art Unit : 1751  
 Serial No. : 09/751,047                      Examiner : Preeti Kumar  
 Filed : December 29, 2000  
 Title : LIQUID AUTOMATIC DISHWASHING DETERGENT

**MAIL STOP APPEAL BRIEF - PATENT**

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

**BRIEF ON APPEAL****(1) Real Party in Interest**

The real party in interest is Melaleuca, Inc.

**(2) Related Appeals and Interferences**

None.

**(3) Status of Claims**

Claims 1-55 have been previously cancelled without prejudice.

Claims 56-78 are pending and stand finally rejected.

**(4) Status of Amendments**

All amendments have been entered.

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**CERTIFICATE OF MAILING BY FIRST CLASS MAIL**

I hereby certify under 37 CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

June 17, 2004  
Date of Deposit

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Judy Wasilkus  
Typed or Printed Name of Person Signing Certificate

**(5) Summary of Invention**

The invention relates to liquid automatic dishwashing detergents having at least one enzyme detergent and a pH value less than about 7.0. Such liquid automatic dishwashing detergents can exhibit effective cleaning performances and enzyme stability. See, e.g., page 2, line 1-21 of Applicants' specification.

**(6) Issue**

Whether the subject matter of claims 56-78 would have been obvious in view of the Marshall *et al.* reference (U.S. Patent No. 5,691,292) combined with the Ospinal *et al.* reference (U.S. Patent No. 5,965,508)?

**(7) Grouping of Claims**

Claims 56-58, 63-65, and 76-78 stand or fall together.

The remaining claims, claims 59-62 and 66-75, are separately patentable and fall into separately patentable groups as follows. Claims 59-62 stand or fall together. Claims 66-73 stand or fall together. Claim 74 stands or falls alone. Claim 75 stands or falls alone.

**(8) Argument**

**Whether the subject matter of claims 56-78 would have been obvious in view of the Marshall *et al.* reference (U.S. Patent No. 5,691,292) combined with the Ospinal *et al.* reference (U.S. Patent No. 5,965,508)?**

**A. Grouping of Claims for this Issue**

Claims 56-58, 63-65, and 76-78 stand or fall together. The remaining rejected claims 59-62 and 66-75 fall into separately patentable groups as follows. Claims 59-62 stand or fall together as a separately patentable group since any teaching or suggestion that a person having ordinary skill in the art should make a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing at least one detergent

enzyme, at least one xanthan gum, at least one low foaming nonionic surfactant, at least one non-phosphate detergent builder, and at least one enzyme stabilizer does not necessarily anticipate or render obvious a claim reciting a liquid automatic dishwashing detergent having a protease or amylase that remains active to particular levels (e.g., 90 or 80 percent active for a protease, or 35 or 30 percent active for an amylase) in the detergent after incubating the detergent at 30°C for a particular duration (e.g., one or two weeks).

Claims 66-73 stand or fall together as a separately patentable group since any teaching or suggestion that a person having ordinary skill in the art should make a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing at least one detergent enzyme, at least one xanthan gum, at least one low foaming nonionic surfactant, at least one non-phosphate detergent builder, and at least one enzyme stabilizer does not necessarily anticipate or render obvious a claim reciting a liquid automatic dishwashing detergent having a particular cleaning property such as the ability for 100 grams of the detergent to clean glasses such that the glasses have a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.90, where the alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

Claim 74 stands or falls alone as a separately patentable claim since any teaching or suggestion that a person having ordinary skill in the art should make a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing at least one detergent enzyme, at least one xanthan gum, at least one low foaming nonionic surfactant, at least one non-phosphate detergent builder, and at least one enzyme stabilizer does not necessarily anticipate or render obvious a claim reciting a liquid automatic dishwashing detergent having a pH value from about 5.0 to about 6.5.

Claim 75 stands or falls alone as a separately patentable claim since any teaching or suggestion that a person having ordinary skill in the art should make a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing at least one detergent enzyme, at least one xanthan gum, at least one low foaming nonionic

surfactant, at least one non-phosphate detergent builder, and at least one enzyme stabilizer does not necessarily anticipate or render obvious a claim reciting a liquid automatic dishwashing detergent having a pH value from about 5.0 to about 6.0.

**B. Arguments for Reversal of Examiner's Rejection Regarding this Issue**

Proper analysis under 35 U.S.C. § 103 requires consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). It is axiomatic that in order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103, a prior art reference must teach or suggest, alone or in combination with other prior art references, each and every element of the claimed invention. *See, e.g.*, MPEP § 2143. The Federal Circuit warns that “both the suggestion and the expectation of success must be founded in the prior art, not in the applicant’s disclosure,” and that “it is impermissible to use the claimed invention as a ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *See, In re Dow Chemical Co.*, 837 F.2d 469 (Fed. Cir. 1988) and *In re Fritch*, 972 F.2d 1260 (Fed Cir. 1992).

When determining obviousness, the fact that a reference teaches away from the claimed invention is a significant factor that must be considered. In fact, a “*prima facie* case of obviousness can be rebutted if the applicant . . . can show that the art in any material respect taught away from the claimed invention.” *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997). “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant.” *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353 1360 (Fed. Cir. 1999).

In addition, the so-called “secondary” considerations, such as unexpected results, should be considered in every case when present. See, e.g., *In re Sernaker*, 702 F.2d 989 (Fed. Cir. 1983) citing *In re Fielder and Underwood*, 471 F.2d 640 (Cust. & Pat. App. 1973). In fact, the Federal Circuit stated that:

evidence of secondary considerations may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not. It is to be considered as part of all the evidence, not just when the decisionmaker remains in doubt after reviewing the art.

*Stratoflex, Inc., v. Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983).

### **1. Claims 56-58, 63-65, and 76-78**

In the Official Action mailed September 3, 2003, the Examiner stated that “Marshall et al. do not specifically teach a liquid automatic dishwashing detergent comprising at least one detergent enzyme and having a pH value of less than 7.0 . . . .” Page 4 of September 3, 2003 Official Action. Despite this deficiency, the Examiner contends that “Marshall et al. provide motivation to lower the pH of the detergent composition by teaching that a lower product pH results in a composition which is safer to dishwasher articles (i.e. china, silverware, glass, and the like).” Page 5 of September 3, 2003 Official Action. As explained in the Official Action mailed April 19, 2004, the Examiner combined the teachings of the Ospinal et al. reference with the Marshall et al. reference “because the primary reference [the Marshall et al. reference] does not teach a liquid automatic dishwashing detergent having a pH of less than about 7 . . . .” Page 3 of April 19, 2004 Official Action. The Examiner also stated that the “teachings of Ospinal et al. are relied upon for the general teaching of detergent compositions formulated such that they will have a pH of between about 4.0 and about 10.0, more preferably between about 5 and about 9.5.” Pages 3-4 of April 19, 2004 Official Action. The Examiner concluded that “it would have been obvious . . . to formulate a liquid dishwashing detergent having a pH value less than about 7.0 . . . because the broad teachings of Marshall et al. in combination with Ospinal et al. suggest a liquid detergent composition formulated in such a manner as to have a pH of less than 7.0 . . . .” (Original emphasis) Page 4 of April 19, 2004 Official Action.

Applicants respectfully disagree. Claims 56-58, 63-65, and 76-78, which stand or fall together, recite a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing, *inter alia*, at least one detergent enzyme. The Marshall et al.

reference teaches away from such a liquid automatic dishwashing detergent. When read as a whole, a person having ordinary skill in the art would have appreciated that the Marshall *et al.* reference teaches (1) liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH and (2) the importance of a low alkaline pH to such liquid automatic dishwashing detergents. Column 1, lines 44-47 of the Marshall *et al.* reference state that "a low alkaline product pH (between about 7 and about 11) liquid composition which is substantially free of chlorine and silicate exhibits enhanced cleaning, spotting and filming ability." In addition, column 8, lines 9-23 of the Marshall *et al.* reference state the following:

In the instant compositions, one or more buffering agents can be included which are capable of maintaining the pH of the compositions within the desired alkaline range.

It is in the low alkaline pH range that optimum performance and stability of the enzyme are realized, and it is also within this pH range wherein optimum compositional chemical and physical stability are achieved.

Maintenance of the composition pH between about 7 and about 11, preferably between about 8 and about 11.5, minimizes undesirable degradation of the active enzymes. Maintenance of this particular pH range also maximizes the soil and stain removal properties and prevents spotting and filming during utilization of the present compositions.

(Emphasis added)

Thus, the Marshall *et al.* reference teaches that liquid automatic dishwashing detergents with detergent enzymes should have a low alkaline pH (i.e., an alkaline pH value from about 7 to about 11), not a neutral or acidic pH. In other words, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a neutral or acidic pH value.

Applicants respectfully submit that the term "alkaline" means "having a pH more than 7." Merriam Webster's Collegiate Dictionary, tenth edition, p. 29, Merriam-Webster, Inc., Springfield, Mass. (1997). A copy of this dictionary definition is attached as Attachment 1.

The teaching away disclosed in the Marshall *et al.* reference not only rebuts the Examiner's *prima facie* case of obviousness but also demonstrates the non-obviousness

of the presently claimed invention. As explained above, “a reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant.” *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353 1360 (Fed. Cir. 1999). The Marshall *et al.* reference is such a reference. And, a “*prima facie* case of obviousness can be rebutted if the applicant . . . can show that the art in any material respect taught away from the claimed invention.” *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997). Thus, the Examiner’s rejection under 35 U.S.C. § 103 is improper.

At one point in the Official Action mailed April 19, 2004, the Examiner alleged that the pH “range claimed by the instant application overlaps with the range disclosed by the primary reference.” This is not correct. The Marshall *et al.* reference discloses liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH that is from about 7 to about 11. As explained above, the term “alkaline” means “having a pH more than 7.” Applicants respectfully submit that an alkaline pH is neither a pH of 7 nor a pH of less than about 7. Thus, the Marshall *et al.* reference does not disclose liquid automatic dishwashing detergents having a pH that overlaps with the pH range recited in present claim 56.

Moreover, two sentences after the Examiner’s allegation regarding overlapping pH ranges, the Examiner specifically contradicts this allegation stating that “the primary reference does not teach a liquid automatic dishwashing detergent having a pH of less than about 7 as recited by the instant claims . . . .” Page 3 of the April 19, 2004 Official Action. For the reasons stated above, Applicants agree with the Examiner in that the Marshall *et al.* reference does not teach liquid automatic dishwashing detergents having a pH of less than about 7 as recited in the present claims.

In the Official Action mailed April 19, 2004, the Examiner stated that Applicants’ previous arguments failed to comply with 37 C.F.R. § 1.111(b). The Examiner also implied that Applicants attempted to show non-obviousness by attacking the references individually. Applicants’ response filed January 20, 2004 was fully responsive and properly rebutted the Examiner’s alleged *prima facie* case of obviousness. As explained above, proper analysis under 35 U.S.C. § 103 requires consideration of two factors: (1)

whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). In fact, there “must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination.” *In re Oetiker*, 977 F.2d 1443 (Fed. Cir. 1992).

In the present case, the Examiner alleged that this motivation is provided in the Marshall *et al.* reference. See, page 5 of the September 3, 2003 Official Action. This is incorrect. As stated in the record, the Marshall *et al.* reference provides no such motivation. In fact, as explained above, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a pH value less than about 7. Likewise, the Ospinal *et al.* reference provides no reason, suggestion, or motivation to lower the pH of liquid automatic dishwashing detergents containing detergent enzymes to a value less than about 7. One explanation for the deficiencies of the Ospinal *et al.* reference is the fact that it does not relate to liquid automatic dishwashing detergents. See, Applicants’ previous responses and paragraph 7 of James L. Kurtz’s Declaration filed July 24, 2003. Taken together, it is clear that there is no reason, suggestion, or motivation to combine the teachings of the Marshall *et al.* and Ospinal *et al.* references to arrive at liquid automatic dishwashing detergents containing detergent enzymes and having a pH value less than about 7 as the Examiner contends. Absent such reason, suggestion, or motivation, the *prima facie* case for obviousness is not made out, and the rejection must be withdrawn. See, MPEP § 2143.

Another reason demonstrating the improper combination of the cited references is explained in the last paragraph of § 2143.01 in the Manual of Patent Examining Procedure. This section states that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” MPEP § 2143.01, citing *In re Ratti*, 270 F.2d 810 (CCPA 1959). The principle of operation for the liquid automatic dishwashing detergents disclosed in

the Marshall *et al.* reference is to maintain the pH within the low alkaline pH range to (1) realize optimum enzyme performance and stability, (2) achieve optimum compositional chemical and physical stability, (3) maximize soil and stain removal properties, and (4) prevent spotting and filming. *See*, column 8, lines 13-23 of the Marshall *et al.* reference. The Examiner proposes to modify the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference by lowering the pH to a value that is not within the low alkaline pH range. Such a modification would result in a change in the principle of operation of the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference. Thus, the teachings of the cited references are not sufficient to render the claims *prima facie* obvious.

Additional evidence supporting the patentability of the presently claimed invention includes Applicants' unexpected results. At the time Applicants filed, a person having ordinary skilled in that art would have understood from the Marshall *et al.* reference that optimum enzyme stability in a liquid automatic dishwashing detergent is in the low alkaline pH range. In fact, the Marshall *et al.* reference specifically states that “[i]t is in the low alkaline pH range that optimum performance and stability of the enzyme are realized . . .” *See*, column 8, lines 13-15 of the Marshall *et al.* reference. Applicants unexpectedly found that both protease and amylase detergent enzymes are much more stable in a formula having a pH value less than 7 than they are in a similar formula having an alkaline pH. Page 17, lines 9-23 of Applicants' specification. These unexpected results provide additional evidence of the non-obviousness of the presently claimed invention.

In light of the above, Applicants respectfully request reversal of the Examiner's rejection of claims 56-58, 63-65, and 76-78 under 35 U.S.C. § 103.

## 2. Claims 59-62

The cited references fail to teach or suggest a liquid automatic dishwashing detergent having a pH value less than about 7.0 and containing, *inter alia*, a protease or amylase that remains active to particular levels (e.g., 90 or 80 percent active for a protease, or 35 or 30 percent active for an amylase) in the detergent after incubating the

detergent at 30°C for a particular duration (e.g., one or two weeks). In fact, the Marshall *et al.* reference, which is the only cited reference that relates to liquid automatic dishwashing detergents, fails to provide enzyme activity levels for a single liquid automatic dishwashing detergent having a pH less than about 7. In addition, at no point does the combination of cited references teach or suggest liquid automatic dishwashing detergents having both a pH less than about 7 and the recited enzyme activity levels. Thus, the cited references do not render the presently claimed invention obvious.

In the Official Action mailed September 3, 2003, the Examiner asserted that “the broad teachings of Marshall et al. would encompass compositions comprising the same enzymes, having the same activities as recited by the instant claims since Marshall et al. teach compositions containing the same components in the same proportions as recited by the instant claims.” Page 3 of September 3, 2003 Official Action. Determining obviousness does not rest on what is “encompassed” by the teachings of a prior art reference. Instead, proper analysis under 35 U.S.C. § 103 requires consideration of (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). As explained above, the cited references fail to suggest a single liquid automatic dishwashing detergent having both a pH less than about 7 and the recited enzyme activity levels.

Moreover, the Examiner’s assertion is based on a false premise, i.e., that the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference are the same as the presently claimed liquid automatic dishwashing detergents. They are not the same. For example, the presently claimed liquid automatic dishwashing detergents have a pH value less than about 7, while those disclosed in the Marshall *et al.* reference have a low alkaline pH. Applicants note that according to the Marshall *et al.* reference, the maintenance of the composition pH in the low alkaline range is important for optimum enzyme stability.

In light of the above, Applicants respectfully request reversal of the Examiner’s rejection of claims 59-62 under 35 U.S.C. § 103.

### 3. Claims 66-73

The cited references fail to teach or suggest a liquid automatic dishwashing detergent that (1) have a pH value less than about 7.0, (2) contain, *inter alia*, at least one detergent enzyme, and (3) have a particular cleaning property such as the ability for 100 grams of the detergent to clean glasses such that the glasses have a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.90, where the alkaline liquid automatic dishwashing detergent contains phosphates and chlorine. In fact, the Marshall *et al.* reference, which is the only cited reference that relates to liquid automatic dishwashing detergents, fails to provide cleaning properties for a single liquid automatic dishwashing detergent having a pH less than about 7. In addition, at no point does the combination of cited references teach or suggest liquid automatic dishwashing detergents having both a pH less than about 7 and the recited cleaning properties. Thus, the cited references do not render the presently claimed invention obvious.

In the Official Action mailed September 3, 2003, the Examiner asserted that “the broad teachings of Marshall et al. would encompass compositions comprising the same performance values as recited by the instant claims since Marshall et al. teach tableware cleaning compositions containing the same components in the same proportions as recited by the instant claims.” Page 3 of September 3, 2003 Official Action.

Determining obviousness does not rest on what is “encompassed” by the teachings of a prior art reference. Instead, proper analysis under 35 U.S.C. § 103 requires consideration of (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). As explained above, the cited references fail to suggest a single liquid automatic dishwashing detergent having both a pH less than about 7 and the recited cleaning properties.

Moreover, the Examiner's assertion is based on a false premise, i.e., that the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference are the same as the presently claimed liquid automatic dishwashing detergents. They are not the same. For example, the presently claimed liquid automatic dishwashing detergents have a pH value less than about 7, while those disclosed in the Marshall *et al.* reference have a low alkaline pH. Applicants note that according to the Marshall *et al.* reference, the maintenance of the composition pH in the low alkaline range is important for (1) optimizing enzyme stability, (2) maximizing soil and stain removal properties, and (3) preventing spotting and filming.

In light of the above, Applicants respectfully request reversal of the Examiner's rejection of claims 66-73 under 35 U.S.C. § 103.

#### 4. Claim 74

Claim 74 requires the liquid automatic dishwashing detergent to have a pH value from about 5.0 to about 6.5. The Marshall *et al.* reference teaches away from such a liquid automatic dishwashing detergent. When read as a whole, a person having ordinary skill in the art would have appreciated that the Marshall *et al.* reference teaches (1) liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH and (2) the importance of a low alkaline pH to such liquid automatic dishwashing detergents. Column 1, lines 44-47 of the Marshall *et al.* reference state that "a low alkaline product pH (between about 7 and about 11) liquid composition which is substantially free of chlorine and silicate exhibits enhanced cleaning, spotting and filming ability." In addition, column 8, lines 9-23 of the Marshall *et al.* reference state the following:

In the instant compositions, one or more buffering agents can be included which are capable of maintaining the pH of the compositions within the desired alkaline range.

...

It is in the low alkaline pH range that optimum performance and stability of the enzyme are realized, and it is also within this pH range wherein optimum compositional chemical and physical stability are achieved.

Maintenance of the composition pH between about 7 and about 11, preferably between about 8 and about 11.5, minimizes undesirable degradation of the active enzymes. Maintenance of this particular pH range also maximizes the soil and stain removal properties and prevents spotting and filming during utilization of the present compositions.

(Emphasis added)

Thus, the Marshall *et al.* reference teaches that liquid automatic dishwashing detergents with detergent enzymes should have a low alkaline pH (i.e., an alkaline pH value from about 7 to about 11), not a neutral or acidic pH. In other words, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.5.

Applicants respectfully submit that the term “alkaline” means “having a pH more than 7.” Merriam Webster’s Collegiate Dictionary, tenth edition, p. 29, Merriam-Webster, Inc., Springfield, Mass. (1997). A copy of this dictionary definition is attached as Attachment 1.

The teaching away disclosed in the Marshall *et al.* reference not only rebuts the Examiner’s *prima facie* case of obviousness but also demonstrates the non-obviousness of the presently claimed invention. As explained above, “a reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant.” *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353 1360 (Fed. Cir. 1999). The Marshall *et al.* reference is such a reference. And, a “prima facie case of obviousness can be rebutted if the applicant . . . can show that the art in any material respect taught away from the claimed invention.” *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997). Thus, the Examiner’s rejection of claim 74 under 35 U.S.C. § 103 is improper.

At one point in the Official Action mailed April 19, 2004, the Examiner alleged that the pH “range claimed by the instant application overlaps with the range disclosed by the primary reference.” This is not correct. The Marshall *et al.* reference discloses liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH that is from about 7 to about 11. As explained above, the term “alkaline”

means "having a pH more than 7." Applicants respectfully submit that an alkaline pH is neither a pH of 7 nor a pH of less than about 7. Thus, the Marshall *et al.* reference does not disclose liquid automatic dishwashing detergents having a pH that overlaps with a pH value that is from about 5.0 to about 6.5.

Moreover, two sentences after the Examiner's allegation regarding overlapping pH ranges, the Examiner specifically contradicts this allegation stating that "the primary reference does not teach a liquid automatic dishwashing detergent having a pH of less than about 7 as recited by the instant claims . . ." Page 3 of the April 19, 2004 Official Action. For the reasons stated above, Applicants agree with the Examiner in that the Marshall *et al.* reference does not teach liquid automatic dishwashing detergents having a pH of less than about 7 as recited in the present claims.

In the Official Action mailed April 19, 2004, the Examiner stated that Applicants' previous arguments failed to comply with 37 C.F.R. § 1.111(b). The Examiner also implied that Applicants attempted to show non-obviousness by attacking the references individually. Applicants' response filed January 20, 2004 was fully responsive and properly rebutted the Examiner's alleged *prima facie* case of obviousness. As explained above, proper analysis under 35 U.S.C. § 103 requires consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). In fact, there "must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." *In re Oetiker*, 977 F.2d 1443 (Fed. Cir. 1992).

In the present case, the Examiner alleged that this motivation is provided in the Marshall *et al.* reference. See, page 5 of the September 3, 2003 Official Action. This is incorrect. As stated in the record, the Marshall *et al.* reference provides no such motivation. In fact, as explained above, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.5. Likewise, the Ospinal *et al.* reference provides no

reason, suggestion, or motivation to lower the pH of liquid automatic dishwashing detergents containing detergent enzymes to a value from about 5.0 to about 6.5. One explanation for the deficiencies of the Ospinal *et al.* reference is the fact that it does not relate to liquid automatic dishwashing detergents. *See*, Applicants' previous responses and paragraph 7 of James L. Kurtz's Declaration filed July 24, 2003. Taken together, it is clear that there is no reason, suggestion, or motivation to combine the teachings of the Marshall *et al.* and Ospinal *et al.* references to arrive at liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.5 as the Examiner contends. Absent such reason, suggestion, or motivation, the *prima facie* case for obviousness is not made out, and the rejection must be withdrawn. *See*, MPEP § 2143.

Another reason demonstrating the improper combination of the cited references is explained in the last paragraph of § 2143.01 in the Manual of Patent Examining Procedure. This section states that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” MPEP § 2143.01, citing *In re Ratti*, 270 F.2d 810 (CCPA 1959). The principle of operation for the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference is to maintain the pH within the low alkaline pH range to (1) realize optimum enzyme performance and stability, (2) achieve optimum compositional chemical and physical stability, (3) maximize soil and stain removal properties, and (4) prevent spotting and filming. *See*, column 8, lines 13-23 of the Marshall *et al.* reference. The Examiner proposes to modify the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference by lowering the pH to a value that is not within the low alkaline pH range. Such a modification would result in a change in the principle of operation of the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference. Thus, the teachings of the cited references are not sufficient to render claim 74 *prima facie* obvious.

Additional evidence supporting the patentability of the presently claimed invention includes Applicants' unexpected results. At the time Applicants filed, a person

having ordinary skilled in that art would have understood from the Marshall *et al.* reference that optimum enzyme stability in a liquid automatic dishwashing detergent is in the low alkaline pH range. In fact, the Marshall *et al.* reference specifically states that “[i]t is in the low alkaline pH range that optimum performance and stability of the enzyme are realized . . . .” See, column 8, lines 13-15 of the Marshall *et al.* reference. Applicants unexpectedly found that both protease and amylase detergent enzymes are much more stable in a formula having a pH value less than 7 than they are in a similar formula having an alkaline pH. Page 17, lines 9-23 of Applicants' specification. These unexpected results provide additional evidence of the non-obviousness of the presently claimed invention.

In light of the above, Applicants respectfully request reversal of the Examiner's rejection of claim 74 under 35 U.S.C. § 103.

### 5. Claim 75

Claim 75 requires the liquid automatic dishwashing detergent to have a pH value from about 5.0 to about 6.0. The Marshall *et al.* reference teaches away from such a liquid automatic dishwashing detergent. When read as a whole, a person having ordinary skill in the art would have appreciated that the Marshall *et al.* reference teaches (1) liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH and (2) the importance of a low alkaline pH to such liquid automatic dishwashing detergents. Column 1, lines 44-47 of the Marshall *et al.* reference state that “a low alkaline product pH (between about 7 and about 11) liquid composition which is substantially free of chlorine and silicate exhibits enhanced cleaning, spotting and filming ability.” In addition, column 8, lines 9-23 of the Marshall *et al.* reference state the following:

In the instant compositions, one or more buffering agents can be included which are capable of maintaining the pH of the compositions within the desired alkaline range.

. . .

It is in the low alkaline pH range that optimum performance and stability of the enzyme are realized, and it is also within this pH range wherein optimum compositional chemical and physical stability are achieved.

Maintenance of the composition pH between about 7 and about 11, preferably between about 8 and about 11.5, minimizes undesirable degradation of the active enzymes. Maintenance of this particular pH range also maximizes the soil and stain removal properties and prevents spotting and filming during utilization of the present compositions.

(Emphasis added)

Thus, the Marshall *et al.* reference teaches that liquid automatic dishwashing detergents with detergent enzymes should have a low alkaline pH (i.e., an alkaline pH value from about 7 to about 11), not a neutral or acidic pH. In other words, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.0.

Applicants respectfully submit that the term “alkaline” means “having a pH more than 7.” Merriam Webster’s Collegiate Dictionary, tenth edition, p. 29, Merriam-Webster, Inc., Springfield, Mass. (1997). A copy of this dictionary definition is attached as Attachment 1.

The teaching away disclosed in the Marshall *et al.* reference not only rebuts the Examiner’s *prima facie* case of obviousness but also demonstrates the non-obviousness of the presently claimed invention. As explained above, “a reference may be said to teach away when a person of ordinary skill, upon reading the reference, . . . would be led in a direction divergent from the path that was taken by the applicant.” *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353 1360 (Fed. Cir. 1999). The Marshall *et al.* reference is such a reference. And, a “*prima facie* case of obviousness can be rebutted if the applicant . . . can show that the art in any material respect taught away from the claimed invention.” *In re Geisler*, 116 F.3d 1465, 1469 (Fed. Cir. 1997). Thus, the Examiner’s rejection of claim 74 under 35 U.S.C. § 103 is improper.

At one point in the Official Action mailed April 19, 2004, the Examiner alleged that the pH “range claimed by the instant application overlaps with the range disclosed by the primary reference.” This is not correct. The Marshall *et al.* reference discloses liquid automatic dishwashing detergents containing detergent enzymes and having a low alkaline pH that is from about 7 to about 11. As explained above, the term “alkaline”

means "having a pH more than 7." Applicants respectfully submit that an alkaline pH is neither a pH of 7 nor a pH of less than about 7. Thus, the Marshall *et al.* reference does not disclose liquid automatic dishwashing detergents having a pH that overlaps with a pH value that is from about 5.0 to about 6.0.

Moreover, two sentences after the Examiner's allegation regarding overlapping pH ranges, the Examiner specifically contradicts this allegation stating that "the primary reference does not teach a liquid automatic dishwashing detergent having a pH of less than about 7 as recited by the instant claims . . ." Page 3 of the April 19, 2004 Official Action. For the reasons stated above, Applicants agree with the Examiner in that the Marshall *et al.* reference does not teach liquid automatic dishwashing detergents having a pH of less than about 7 as recited in the present claims.

In the Official Action mailed April 19, 2004, the Examiner stated that Applicants' previous arguments failed to comply with 37 C.F.R. § 1.111(b). The Examiner also implied that Applicants attempted to show non-obviousness by attacking the references individually. Applicants' response filed January 20, 2004 was fully responsive and properly rebutted the Examiner's alleged *prima facie* case of obviousness. As explained above, proper analysis under 35 U.S.C. § 103 requires consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed product, and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). In fact, there "must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." *In re Oetiker*, 977 F.2d 1443 (Fed. Cir. 1992).

In the present case, the Examiner alleged that this motivation is provided in the Marshall *et al.* reference. See, page 5 of the September 3, 2003 Official Action. This is incorrect. As stated in the record, the Marshall *et al.* reference provides no such motivation. In fact, as explained above, the Marshall *et al.* reference teaches away from liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.0. Likewise, the Ospinal *et al.* reference provides no

reason, suggestion, or motivation to lower the pH of liquid automatic dishwashing detergents containing detergent enzymes to a value from about 5.0 to about 6.0. One explanation for the deficiencies of the Ospinal *et al.* reference is the fact that it does not relate to liquid automatic dishwashing detergents. *See*, Applicants' previous responses and paragraph 7 of James L. Kurtz's Declaration filed July 24, 2003. Taken together, it is clear that there is no reason, suggestion, or motivation to combine the teachings of the Marshall *et al.* and Ospinal *et al.* references to arrive at liquid automatic dishwashing detergents containing detergent enzymes and having a pH value from about 5.0 to about 6.0 as the Examiner contends. Absent such reason, suggestion, or motivation, the *prima facie* case for obviousness is not made out, and the rejection must be withdrawn. See, MPEP § 2143.

Another reason demonstrating the improper combination of the cited references is explained in the last paragraph of § 2143.01 in the Manual of Patent Examining Procedure. This section states that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” MPEP § 2143.01, citing *In re Ratti*, 270 F.2d 810 (CCPA 1959). The principle of operation for the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference is to maintain the pH within the low alkaline pH range to (1) realize optimum enzyme performance and stability, (2) achieve optimum compositional chemical and physical stability, (3) maximize soil and stain removal properties, and (4) prevent spotting and filming. *See*, column 8, lines 13-23 of the Marshall *et al.* reference. The Examiner proposes to modify the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference by lowering the pH to a value that is not within the low alkaline pH range. Such a modification would result in a change in the principle of operation of the liquid automatic dishwashing detergents disclosed in the Marshall *et al.* reference. Thus, the teachings of the cited references are not sufficient to render claim 75 *prima facie* obvious.

Additional evidence supporting the patentability of the presently claimed invention includes Applicants' unexpected results. At the time Applicants filed, a person

Applicant: Suk H. Cho et al.  
Serial No.: 09/751,047  
Filed: December 29, 2000  
Page: 20 of 25

Attorney's Docket No.: 09143-012001

having ordinary skilled in that art would have understood from the Marshall *et al.* reference that optimum enzyme stability in a liquid automatic dishwashing detergent is in the low alkaline pH range. In fact, the Marshall *et al.* reference specifically states that “[i]t is in the low alkaline pH range that optimum performance and stability of the enzyme are realized . . . .” See, column 8, lines 13-15 of the Marshall *et al.* reference. Applicants unexpectedly found that both protease and amylase detergent enzymes are much more stable in a formula having a pH value less than 7 than they are in a similar formula having an alkaline pH. Page 17, lines 9-23 of Applicants' specification. These unexpected results provide additional evidence of the non-obviousness of the presently claimed invention.

In light of the above, Applicants respectfully request reversal of the Examiner's rejection of claim 75 under 35 U.S.C. § 103.

The fee for the appeal brief is enclosed. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: June 17, 2004



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### **Appendix of Claims**

56. A liquid automatic dishwashing detergent having a pH value less than about 7.0, wherein said detergent comprises, by weight:

- (a) from about 0.05 percent to about 5.0 percent of at least one detergent enzyme,
- (b) from about 0.2 percent to about 5.0 percent of at least one xanthan gum,
- (c) from about 0.05 percent to about 5.0 percent of at least one low foaming nonionic surfactant,
- (d) from about 0.5 percent to about 30.0 percent of at least one non-phosphate detergent builder, and
- (e) from about 0.01 percent to about 30.0 percent of at least one enzyme stabilizer.

57. The detergent of claim 56, wherein said detergent is free of chlorine sources.

58. The detergent of claim 56, wherein said detergent is free of phosphate builders.

59. The detergent of claim 56, wherein said enzyme comprises a protease that remains greater than 90 percent active in said detergent after incubating said detergent at 30°C for one week.

60. The detergent of claim 56, wherein said enzyme comprises a protease that remains greater than 80 percent active in said detergent after incubating said detergent at 30°C for two weeks.

61. The detergent of claim 56, wherein said enzyme comprises an amylase that remains greater than 35 percent active in said detergent after incubating said detergent at 30°C for one week.

62. The detergent of claim 56, wherein said enzyme comprises an amylase that remains greater than 30 percent active in said detergent after incubating said detergent at 30°C for two weeks.

63. The detergent of claim 56, wherein said surfactant comprises a surfactant selected from the group consisting of:

(a) first condensation products, wherein said first condensation products are condensates from a first mixture containing about one mole of a straight or branched chain fatty alcohol or acid and from about four to about forty moles of ethylene oxide, wherein said alcohol or acid is saturated or unsaturated, and wherein the chain of said alcohol or acid contains from about ten to about twenty carbon atoms;

(b) second condensation products, wherein said second condensation products are condensates from a second mixture containing about one mole of alkyl phenol and from about four to about fifty moles of ethylene oxide, wherein the alkyl chain of said alkyl phenol contains from about eight to about eighteen carbon atoms;

(c) polyoxypropylene, polyoxyethylene condensates having the formula  $R_1O(CH_2CH_2O)_x(CH(CH_3)CH_2O)_yR_2$ , wherein  $R_1$  is H or an alkyl group having from one to four carbon atoms, wherein  $R_2$  is H or an alkyl group having from one to four carbon atoms, wherein x is an integer greater than or equal to one, wherein y is an integer greater than or equal to one, wherein the total  $C_2H_4O$  content is from about 20 percent to about 90 percent of the total weight of said polyoxypropylene, polyoxyethylene condensates, and wherein the molecular weight of said polyoxypropylene, polyoxyethylene condensates is from about 2000 Daltons to about 10,000 Daltons; and

(d) capped condensates, wherein said capped condensates comprise said polyoxypropylene, polyoxyethylene condensates capped with at least one capping molecule, said capping molecule being selected from the group consisting of propylene oxide, butylene oxide, short chain alcohols, and short chain fatty acids.

64. The detergent of claim 56, wherein said non-phosphate detergent builder is selected from the group consisting of citric acid, alkali metal salt forms of citric acid, and ammonium salt forms of citric acid.

65. The detergent of claim 56, wherein said enzyme stabilizer is selected from the group consisting of propylene glycol, sorbitol, fructose, sucrose, glucose, short chain carboxylic acids, salt forms of short chain carboxylic acids, polyhydroxyl compounds, boric acid, soluble salt forms of boric acid, boronic acid, and soluble salt forms of boronic acid.

66. The detergent of claim 56, wherein 100 grams of said detergent cleans glasses such that said glasses have a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.90, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

67. The detergent of claim 56, wherein 100 grams of said detergent cleans flatware such that said flatware has a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 2.10, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

68. The detergent of claim 56, wherein 100 grams of said detergent cleans white plates such that said white plates have a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.70, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

69. The detergent of claim 56, wherein 100 grams of said detergent cleans gold plates such that said gold plates have a grade value less than about 2.50 for spots after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.80, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

70. The detergent of claim 56, wherein 100 grams of said detergent cleans glasses such that said glasses have a grade value less than about 2.50 for film after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.90, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

71. The detergent of claim 56, wherein 100 grams of said detergent cleans flatware such that said flatware has a grade value less than about 2.50 for film after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.90, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

72. The detergent of claim 56, wherein 100 grams of said detergent cleans white plates such that said white plates have a grade value less than about 2.50 for film after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.60, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

73. The detergent of claim 56, wherein 100 grams of said detergent cleans gold plates such that said gold plates have a grade value less than about 2.50 for film after performing a standard wash test with 200 grams of an alkaline liquid automatic dishwashing detergent being used as a control set to a reference grade value of 1.80, wherein said alkaline liquid automatic dishwashing detergent contains phosphates and chlorine.

74. The detergent of claim 56, wherein said pH value is from about 5.0 to about 6.5.

75. The detergent of claim 56, wherein said pH value is from about 5.0 to about 6.0.

76. The detergent of claim 56, wherein said detergent comprises at least one pH adjusting agent such that said detergent has said pH value.

77. The detergent of claim 56, wherein said detergent comprises at least one calcium ion source.

78. The detergent of claim 77, wherein said calcium ion source comprises from about 0.01 percent to about 5.0 percent of said detergent by weight.



# Merriam- Webster's Collegiate® Dictionary

TENTH EDITION

Merriam-Webster, Incorporated  
Springfield, Massachusetts, U.S.A.

the profile 4 : an arrangement of groups or forces in relation to one another *new* ~s within the political party)

**al-like** *v.-lik'* *adv* (14c) : in the same manner, form, or degree  
: **EQUALLY** (was denounced by teachers and students ~)

**al-like** *adj* [ME *alik*, *ilich* (fr. OE *gelic*) & *alik*, alter. of OE *onlic*, fr. *on* + *lic* body — more at *LIKE*] (15c) : exhibiting close resemblance without being identical (~ in their beliefs) — **alike-ness** *n*

**al-i-men-tal** *\-məntl'* *adj* [M.E. fr. L *alimentum*, fr. *alere* to nourish — more at OLD] (15c) : **FOOD, NUTRIMENT**; also : **SUSTENANCE** (there was nothing there of conversational ~ — Kingsley Amis)

**al-i-men-tal** *\-mentl'* *vt* (15c) : to give aliment to : **NOURISH, SUSTAIN**

**al-i-men-tary** *\-a-men-tärē'* *adj* (1615) 1 : of or relating to nourishment or nutrition 2 : furnishing sustenance or maintenance

**alimentary canal** *n* (1764) : the tubular passage that extends from mouth to anus and functions in digestion and absorption of food and elimination of residual waste

**al-i-men-ta-tion** *\-a-men-tāshn*, *-men-tān* *(ca. 1656)* : the act or process of affording nutriment or nourishment (intravenous ~)

**al-i-mo-ny** *\-a-lə-mō-nē* *n, pl -nies* [L *alimonia* sustenance, fr. *alere*] (1656) 1 : an allowance made to one spouse by the other for support pending or after legal separation or divorce 2 : the means of living : **MAINTENANCE**

**A-line** *\-lin'* *adj* (1964) : having a flared bottom and a close-fitting top — used of a garment (an ~ skirt)

**al-i-phat-ic** *\-a-lə-fä-tik'* *adj* [ISV, fr. Gk *aleiphat-*, *aleiphar* oil, fr. *aleiphein* to smear; perh. akin to Gk *lipos* fat — more at LEAVE] (1889) : of, relating to, or being an organic compound having an open-chain structure (as an alkane) — compare **ALICYCLIC, AROMATIC** 2

**al-i-quot** *\-a-lə-kwōt*, *-kwōt\* *adj* [ML *aliquotus*, fr. L *aliquot* some, several, fr. *alius* other + *quot* how many — more at ELSE, QUOTE] (1570) 1 : contained an exact number of times in something else — used of a divisor or part (5 is an ~ part of 15) (an ~ portion of a solution) 2 : **FRACTIONAL** (an ~ part of invested capital) — **aliquot** *n*

**A-list** *\-list'* *list* (n 1980) : a list or group of individuals of the highest level of society, excellence, or eminence

**al-it-er-a-cy** *\-a-lī'-tər-ə-sē, -sē* *n* (1984) : the quality or state of being able to read but uninterested in doing so — **alit-er-a-te** *\-li-tər-ət\* *adj* or *n*

**alive** *\-liv'* *adj* [ME, fr. OE *on life*, fr. *on* + *liif* life] (bef. 12c) 1 : having life : not dead or inanimate 2 : still in existence, force, or operation : **ACTIVE** (kept hope ~) 3 : knowing or realizing the existence of : **SENSITIVE** (~ to the danger) 4 : marked by alertness, energy, or briskness 5 : marked by much life, animation, or activity : **SWARMING** (streets ~ with traffic) 6 — used as an intensive following the noun (the proudest boy ~) — **syn** see **AWARE** — **alive-ness** *n*

**ali-yah** or **ali-ya** *\-ä-lē-,ä-yä* *n* [NHeb *aliyah*, fr. Heb, ascent] (ca. 1934) : the immigration of Jews to Israel

**ali-zar-in** *\-li-zä-rən* *n* [prob. Fr. *alizarine*] (ca. 1835) 1 : an orange or red crystalline compound  $C_14H_10O_4$  formerly prepared from madder and now made synthetically and used esp. to dye Turkey reds and in making red pigments 2 : any of various acid, mordant, and solvent dyes derived like alizarin proper from anthraquinone

**al-ka-hest** *\-al-kə-hest\* *n* [NL *alchahes*] (1641) : the universal solvent believed by alchemists to exist — **al-ka-hes-tic** *\-al-kə-hes-tik\* *adj*

**al-ka-li** *\-al-kə-lē* *n* *pl -lies or -lis* [ME, fr. ML, fr. Ar *al-qili* the ashes of the plant saltwort] (14c) 1 : a soluble salt obtained from the ashes of plants and consisting largely of potassium or sodium carbonate; **brodly** : a substance (as a hydroxide or carbonate of an alkali metal) having marked basic properties — compare **BASE** 7a 2 : **ALKALI METAL** 3 : a soluble salt or a mixture of soluble salts present in some soils of arid regions in quantity detrimental to agriculture

**alkali metal** *n* (ca. 1885) : any of the univalent mostly basic metals of group I of the periodic table comprising lithium, sodium, potassium, rubidium, cesium, and francium — see **PERIODIC TABLE** table

**al-ka-lim-e-ter** *\-al-kə-'lim-ə-tər\* *n* [F *alcalimétrie*, fr. *alcali* alkali + *-mètre* -meter] (ca. 1828) : an apparatus for measuring the strength or the amount of alkali in a mixture or solution — **al-ka-lim-e-triy** *\-'lim-ə-trē* *n*

**al-ka-line** *\-al-kə-lēn*, *-lin* *adj* (1677) : of, relating to, containing, or having the properties of an alkali or alkali metal : **BASIC**; esp. of a **solution** : having a pH of more than 7 — **al-ka-line-ity** *\-al-kə-'lin-ə-tē* *n*

**alkaline battery** *n* (1941) : a long-lived dry cell that has an alkaline electrolyte which decreases corrosion of the cell — called also **alkaline cell**

**alkaline earth metal** *n* (ca. 1903) : any of the bivalent strongly basic metals of group II of the periodic table comprising beryllium, magnesium, calcium, strontium, barium, and radium — called also **alkaline earth**; see **PERIODIC TABLE** table

**alkaline phosphatase** *n* (1949) : any of the phosphatases that are optimally active in alkaline medium and occur in esp. high concentrations in bone, the liver, the kidneys, and the placenta

**al-ka-lin-i-ze** *\-al-kə-lə-niz\* *vt -ized; -iz-ing* (1800) : to make alkaline — **al-ka-lin-i-za-tion** *\-al-kə-lə-ni-zāshn*, *-zə-nāshn\* *n*

**al-ka-loid** *\-al-kə-lōid\* *n* (ca. 1831) : any of numerous usu. colorless, complex, and bitter organic bases (as morphine or codeine) containing nitrogen and usu. oxygen that occur esp. in seed plants — **al-ka-lo-dal** *\-al-kə-'lōid\* *adj*

**al-ka-lo-sis** *\-al-kə-lō-sēs\* *n* (1911) : an abnormal condition of increased alkalinity of the blood and tissues — **al-ka-lo-tic** *\-'lä-tik\* *adj*

**alkane** *\-al-kān'* *n* [*alkyl* + *-ane*] (1899) : any of numerous saturated hydrocarbons; **specif** : any of a series of open-chain hydrocarbons  $C_nH_{2n+2}$  (as methane and butane) — called also **paraffin**

**al-ka-ret** *\-al-kə-'ret\* *n* [ME, fr. OSp *alcaneta*, dim. of *alcana* henna shrub, fr. ML *alchanna*, fr. Ar *al-hinnā* the henna] (14c) 1 : a European plant (*Alkanetriactoria*) of the borage family; also : its root 2 : a red dyestuff prepared from the root 2 : a plant (*Anchusa officinalis*) of the borage family with delicate usu. blue flowers

**al-kene** *\-al-kēn'* *[ISV alkyl + -ene]* (1899) : any of numerous unsaturated hydrocarbons having one double bond; **specif** : any of a series of open-chain hydrocarbons  $C_nH_{2n}$  (as ethylene)

**al-ko-ox-ide** *\-al-kāk-,sid-,sēd\* *n* [*alkyl* + *oxide*] (ca. 1889) : a basic salt derived from an alcohol by the replacement of the hydroxyl hydrogen with a metal

**alk-oxy** \al'-käk-së\ adj [ISV *alkyl* + *oxygen*] (ca. 1925) : of, relating to, or containing a univalent radical composed of an alkyl group united with oxygen — often used in combination

**al-kyd** \al-käd\ n [blend of *alkyl* and *acid*] (1929) 1 : any of numerous synthetic resins that are used esp. for protective coatings and in paint 2 : a paint in which the vehicle is an alkyd resin

**al-kyl** \al-käl\ adj (1882) : having a monovalent organic group and esp. one  $C_nH_{2n+1}$  (as methyl) derived from an alkane (as methane)

**alkyl** n [prob. fr. G. fr. *Alkohol* alcohol] (1952) : a compound of one or more alkyl groups with a metal (mercury ~s)

**alkylating agent** n (1900) : a substance that causes replacement of hydrogen by an alkyl group esp. in a biologically important molecule; *specif.* : one with mutagenic activity that inhibits cell division and growth and is used to treat some cancers

**al-kylation** \al-ka-läshän\ n (1900) : the act or process of introducing one or more alkyl groups into a compound (as to increase octane number in a motor fuel) — **al-kyl-ate** \al-ka-lät\ vt

**al-kyne** \al-kin\ n [alkyl + -yne, alter. of -ine] (ca. 1909) : any of a series of open-chain hydrocarbons  $C_nH_{2n-2}$  (as acetylene) having one triple bond

**all** \ö'l\ adj [ME all, al, fr. OE *eall*; akin to OHG *all all*] (bef. 12c) 1 a : the whole amount or quantity of (needed ~ the courage they had) *(sat up ~ night)* b : as much as possible (spoke in ~ seriousness) 2 : every member or individual component of (~ men will go) (*~ five children were present*) 3 : the whole number or sum of (~ the angles of a triangle are equal to two right angles) 4 : EVERY (~ manner of hardship) 5 : any whatever (beyond ~ doubt) 6 : nothing but : ONLY a : completely taken up with, given to, or absorbed by (became ~ attention) b : having or seeming to have (some physical feature) in conspicuous excess or prominence (~ legs) c : paying full attention with (~ ears) 7 *dial* : used up : entirely consumed — used esp. of food and drink 8 : being more than one person or thing (who ~ is coming) *syn* see WHOLE — **all the** : as much of . . . as : as much of a . . . as (*all the home I ever had*)

**all** adv (bef. 12c) 1 a : WHOLLY. QUITE (*sat ~ alone*) — often used as an intensive (*~ out of proportion*) (*~ over the yard*) b : selected as the best (as at a sport) within an area or organization — used in combination (*all-league halfback*) 2 *obs.* : ONLY. EXCLUSIVELY 3 *archaic* : JUST 4 : so much (*~ the better for it*) 5 : for each side : APIECE (the score is two ~)

**all pron** (bef. 12c) 1 : the whole number, quantity, or amount : TOTALITY (~ that I have) (~ of us) (~ of the books) 2 : EVERYBODY. EVERYTHING (gave equal attention to ~) (*that is ~*) — **all in all** : on the whole : GENERALLY (*all in all*, things might have been worse) — and **all** : and everything else esp. of a kind suggested by a previous context (cards to fill out with . . . numbers *and all* —Sally Quinn)

**all n** (1593) : the whole of one's possessions, resources, or energy (gave his ~ for the cause)

**all- or allo-** comb form [Gk, fr. *allo* other — more at ELSE] 1 : other : different : atypical (*alloarmous*) (*alloropy*) 2 **allo-** : isomeric form or variety of (a specified chemical compound) (*allopurinol*) 3 **allo-** : being one of a group whose members together constitute a structural unit esp. of a language (*allophone*)

**alla breve** \ä-la-brü'brev, -ä-la'-bre-, -vä\ n [It. lit., according to the breve] (ca. 1740) : the sign marking a piece or passage to be played alla breve; *also* : a passage so marked

**alla breve** adv or adj (ca. 1823) : in duple or quadruple time with the beat represented by the half note

**All-lah** \ä'-lä, 'ä-lä, ä'-lä\ n [Ar *allâh*] (1584) : GOD *lä* — used in Islam

**all along** adv (1670) : all the time (knew the truth *all along*)

**Amer-i-can** \ä'-lä-'mer-i-kän\ adj (1888) 1 : also **all-American** ca : selected (as by a poll of journalists) as one of the best in the U.S. in a particular category at a particular time (an ~ quarterback) b : having only all-American participants (an ~ basketball team) 2 : composed wholly of American elements 3 : representative or typical of the U.S. or its ideals (an ~ boy) (her ~ optimism) 4 : of or relating to the American nations as a group

**all-American** n (1920) : one (as an athlete) that is voted all-American

**al-lan-to-in** \ä'-lan-tä-wän\ n [prob. fr. G. fr. NL *allantois* + G. *-in*] (ca. 1845) : a crystalline oxidation product  $C_6H_6N_4O_3$  of uric acid used to promote healing of local wounds and infections

**al-lan-to-is** \ä'-lan-tä-wäs\ n, pl **al-lan-to-ides** \ä'-lan-tö-ä-dëz, -ä'-jan-\ [NL. ultim. fr. Gk *allant*, *allas* sausage] (1646) : a vascular fetal membrane of reptiles, birds, and mammals that is formed as a pouch from the hindgut and that in placental mammals is intimately associated with the chorion in formation of the placenta — **al-lan-to-ic** \ä'-lan-tö-ik, -ä'-lan-\ adj

**al-lar-gan-do** \ä'-lar-gän-, -dö\ adj or adv [It, widening, verbal of *allargare* to widen, fr. L *ad-* + *largare* to widen] (ca. 1893) : becoming gradually slower and more steady — used as a direction in music

**all-around** \ö'-lä'-räund\ adj (1867) 1 : considered in or encompassing all aspects : COMPREHENSIVE (the best ~ performance so far) 2 : competent in many fields (an ~ performer) 3 : having general utility or merit

**allay** \ä'-lä, -ä'-vb [ME *alayen*, fr. OE *älegan*, fr. *ä-* (perfective prefix) + *legan* to lay — more at ABIDE, LAY] vt (14c) 1 : to subdue or reduce in intensity or severity : ALLEVIATE (expect a breeze to ~ the heat) 2 : to make quiet : CALM ~ vi. *obs.* : to diminish in strength : SUBSIDIE *syn* see RELIEVE

**all but** adv (1593) : very nearly : ALMOST (would be *all but* impossible)

**all clear** n (1902) : a signal that a danger has passed

**all-day** \ö'l-dä'\ adj (ca. 1870) : lasting for, occupying, or appearing throughout an entire day (an ~ trip)